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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN THE APPLICATION OF:

RAYMOND JOSEPH REISDORF ET. AL.

CASE NO.: TP2686 US NA APPLICATION NO.: 10/658,084

CONFIRMATION NO.: 1439 GROUP ART UNIT: 1733

EXAMINER: YAO, SAMCHUAN CUA FILED: SEPTEMBER 09, 2003

FOR: PROCESS FOR PRODUCING CARPET

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants submit the following Declaration under 37 C.F.R. 1.132 for the Examiner's consideration, in partial response to the Office Action issued May 18, 2004.

U.S. Serial no. 10/658,084 Docket no. TP-2686 USNA

DECLARATION UNDER 37 C.F.R. 1.132

I, Mr. Raymond J. Reisdorf, do hereby declare as follows:

1. I was granted a Master of Science (1+4 Y) in Industrial Design from Institut St Luc in Liège, Belgium in 1972.
2. I have worked for the assignee of this patent application no. 10/658,084, E.I. du Pont de Nemours and Company since 1974 and I am an expert in Nonwovens Technologies, Carpet Primary Backing Manufacturing as well as in Web Coating Technologies.

3. I am a coinventor of the present application and have discussed, understood and considered the patent examiner's rejection under 35 U.S.C. § 103(a) over Vinod et al. (WO 95/14806 A1) in view of either Scott et al. (U.S. Patent no. 4,798,644) or Reith (U.S. Patent no. 4,939,036) and optionally further in view of Cross (U.S. Patent no. 4,731,143).

4. I disagree with the Examiner's conclusion that the claimed process for preparation of a tufted polyamide-type fiber carpet would have been obvious over the cited references. In order to demonstrate the patentability of the present claims, I submit herewith a comparison between a prior art carpet made according to the base reference Vinod et al. and those made according to the present invention.

5. The following experiments were conducted under my supervision and control. The comparative ("Control Example") data presented below has been presented in my co-pending application, U.S. Serial no. 10/658,082, filed on even date herewith.

6. The Control Examples below were prepared with the same adhesive as is identified in Vinod et al., Example 2 (page 13), which is an ethylene

terpolymer having a melt index of 35. As set forth below, Control Examples 1 and 2 were subjected to the Lisson Tretrad fiber retention test, for comparison to the exemplary data of the present application (pages 20-22).

Control Examples 1 and 2

Control Examples 1 and 2 were prepared using a low viscosity ethylene terpolymer adhesive and under unacceptable process conditions. In Control Examples 1 and 2, the carpet was a 1/10 inch (2.54 mm) gauge cut pile nylon 66 velour carpet with a face fiber weight of 580 g/m^2. The primary backing was a 108 g/m^2 polypropylene spunbonded nonwoven and the nylon 66 face yarn was a 1360 dTex bulk continuous filament ("BCF") yarn. The adhesive resin used was a terpolymer of 80 weight % ethylene, 10 weight % butyl acrylate and 10 weight % methacrylic acid, having a relatively high viscosity (melt index of 35 according to ASTM D-1238 (@ 190 ºC with a weight of 2.16 Kg)). The adhesive resin was applied to the back of the primary backing. The nip roll was a 6 inch (15.2 cm) diameter roll with a rubberized surfaced having an 80 shore A hardness which was covered with a 1.5 mm thick Teflon® sleeve. The chill roll 6 was a 750 cm diameter roll with a metal surface that was cooled to the temperature shown in Table 1. In Control Example 1, the adhesive was applied at a low level of 100 g/m^2 at an extrusion temperature of 230 ºC. In Control Example 2, the adhesive was applied at a level of 700 g/m^2 at an extrusion temperature of 230 ºC.

In Control Example 1, where the coating weight and extrusion temperature were both low for the low melt index polymer adhesive used, it can be seen that the results of both the Lisson Tretrad fiber retention test and the ASTM-D-1335 Tuft Bind test were unacceptable. In Control Example 2, where the coating weight was increased significantly, and the extrusion temperature was held at 230 ºC, the results of the Lisson Tretrad fiber retention test were still unacceptable whereas the carpet exhibited an

acceptable tuft bind of 9.4 Newtons under the ASTM-D-1335 Tuft Bind test.

Table 1

	EXAMPLE	1 (Control)	2 (Control)
First step extrusion coating	Adhesive Basis Weight (g/m^2)	100	700
	Extrusion Melt Temp. (°C)	230	230
	Adhesive Melt Index	35	35
	Chill Roll Temperature (°C)	12	12
	Line Speed (m/min)	25	8
	Air Gap mm	200	200
	Nip Pressure (Kg.cm)	27.3	27.3
PROPERTIES	Tuft Bind (Newtons)	<2	9.4
Lisson Tretrad	M_{av} – Percent Fiber Loss (%)	88.7	58.4
Lisson Tretrad	Visual aspect	1 (failure)	1 (failure)
Lisson Tretrad	h_R	0.48	1.77

7. The following tests are presented as Examples 1 and 2 in the present application at pages 20-22, and are copied below in their entirety for the Examiner's convenience.

Example 1

In Example 1, a carpet was prepared using the flat bed laminator shown in Figure 3. The carpet was a loop pile carpet with a face fiber weight of 690 g/m^2. The primary backing was a 108 g/m^2 polypropylene spunbonded nonwoven and the face yarn was a 1360 dTex BCF nylon 66 yarn.

The polymer adhesive was a terpolymer of ethylene with 10 weight % i-butyl acrylate, 10 weight % methacrylic acid, having a melt index of 400 according to ASTM D-1238 (@190 °C with a weight of 2.16 Kg). The

polymer adhesive had an adhesion with nylon 6,6 of 11.6 N/10 mm and tensile strength of 6.0 MPa.

The tufted primary backing was deposited onto a moving belt with the face yarn side of the carpet facing down. The belt was traveling at 4 meters/min. The polymer adhesive was coated on the backside of the primary backing at a melt temperature of 230 °C and at a basis weight of about 2500 g/m^2, and was covered by a secondary backing. The secondary backing was a 5 mm thick needlefelt fleece with a basis weight of about 550 g/m^2 comprised of 100% fine (~2 dtex) polyethylene terephthalate fibers fibers. The carpet was next passed through a flat bed laminator like that described above with regard to Figure 3. The carpet first passed between a set of two belts that applied a surface pressure of about 2.5 N/cm^2 to the carpet. The belts of the laminator were heated to between 130 and 150 °C by resistance heating modules having flat surfaces that pressed against the back of the belts. The gap between the belts was set at 7 mm. At the end of a 3 m long heated section, the belts, with the carpet between them, passed through a nip that was maintained with a constant opening of 6 mm. The resulting pressure in the nip was 10 N/cm^2. The belts, with the carpet between them next continued into a cooling section where the belts passed between a series of spring-loaded water-chilled modules having a smooth non-sticking surface that pressed against the moving belts so as to maintain a gap of 7 mm between the belts. At the end of the 2 m long cooling section, the belts were removed from the carpet by two rollers. No additional chill rolls were used.

The finished carpet was tested for fiber retention according to the Lisson Tretrad fiber retention test procedure. Upon completion of the Lisson Tretrad fiber retention test procedure, the visual aspect of the finished carpet was rated as category 4 (very good) according to DIN 1963A.

Example 2

In Example 2, a carpet was prepared using the flat bed laminator shown in Figure 3. The carpet was a level loop pile carpet with a face fiber weight of 460 g/m^2. The primary backing was a 108 g/m^2 polypropylene spunbonded nonwoven and the face yarn was a 1360 dTex BCF nylon 66 yarn.

The polymer adhesive was a terpolymer of ethylene with 10 weight % i-butyl acrylate, 10 weight % methacrylic acid, having a melt index of 400 according to ASTM D-1238 (@190 ºC with a weight of 2.16 Kg). The polymer adhesive had an adhesion with nylon 6,6 of 11.6 N/10 mm and tensile strength of 6.0 MPa.

The tufted primary backing was unrolled from a supply roll onto a moving belt with the face yarn side of the carpet facing down. The belt was traveling at 4 meters/min. The polymer adhesive was coated on the backside of the primary backing at a melt temperature of 150 ºC at a basis weight of about 2500 g/m^2, and was covered by a secondary backing. The secondary backing was a 3.5 mm thick needlefelt fleece with a basis weight of about 350 g/m^2 comprised of 100% fine (~2 dtex) polyethylene terephthalate fibers. The carpet was next passed through a flat bed laminator like that described above with regard to Figure 3. The carpet first passed between a set of two belts that applied a surface pressure of about 2.5 N/cm^2 to the carpet. The belts of the laminator were heated to 130 to 150 ºC by resistance heating modules having flat surfaces that pressed against the back of the belts. The gap between the belts was set at 7 mm. At the end of a 3 m long heated section, the belts, with the carpet between them, passed through a nip that was maintained with a constant opening of 6 mm. The resulting pressure in the nip was about 10 N/cm^2. The belts, with the carpet between them next continued into a cooling section where the belts passed between a series of spring-loaded water-chilled modules having a smooth non-sticking surface that pressed against the moving belts so as to maintain a gap of 7 mm between the

belts. At the end of the 2 m long cooling section, the belts were removed from the carpet by two rollers. No additional chill roll was used.

The finished carpet was tested for fiber retention according to the Lisson Tretrad fiber retention test procedure. Upon completion of the Lisson Tretrad fiber retention test procedure, the visual aspect of the finished carpet was rated as category 4 (very good) according to DIN 1963A.

8. Control Examples 1 and 2 are demonstrated to fail the Lisson Tretrad fiber retention test. In contrast, Examples 1 and 2 of the present application (paragraph 7), which utilize a polymer adhesive of the same monomer composition, but with a melt index of 400, provide excellent fiber retention with a visual rating for both examples of Category 4 (very good).

9. The comparative testing data above clearly demonstrates that the use of a lower viscosity (higher melt index) polymer adhesive as claimed in the present application results in benefits which are unobtainable by using the preferred high viscosity (low melt index) polymer adhesives according to Vinod et al., which even fails to recognize such benefits.

10. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Raymond J. Reisdorf

09 November 2004
date